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Lee et al.

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(54) **BACKLIGHT ASSEMBLY AND A DISPLAY APPARATUS HAVING THE SAME**

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(52) **U.S. Cl.**
CPC ***G02F 1/133602*** (2013.01)

(58) **Field of Classification Search**
CPC G02F 1/133603; G02F 2001/133612
See application file for complete search history.

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(57) **ABSTRACT**

A backlight assembly includes a first light source part including a plurality of light sources and extending in a first direction, a second light source part including a plurality of light sources, wherein the second light source part is spaced apart from and in parallel with the first light source part, and a driving part disposed between the first light source part and the second light source part. The driving part is connected to the first and second light source parts, and is configured to drive the light sources of the first and second light source parts.

18 Claims, 11 Drawing Sheets

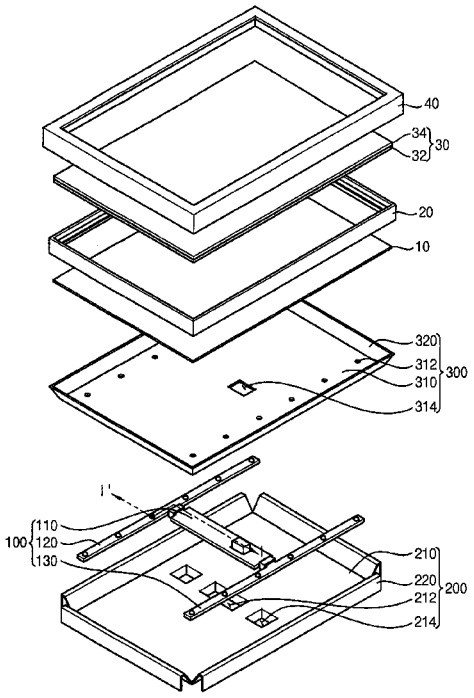
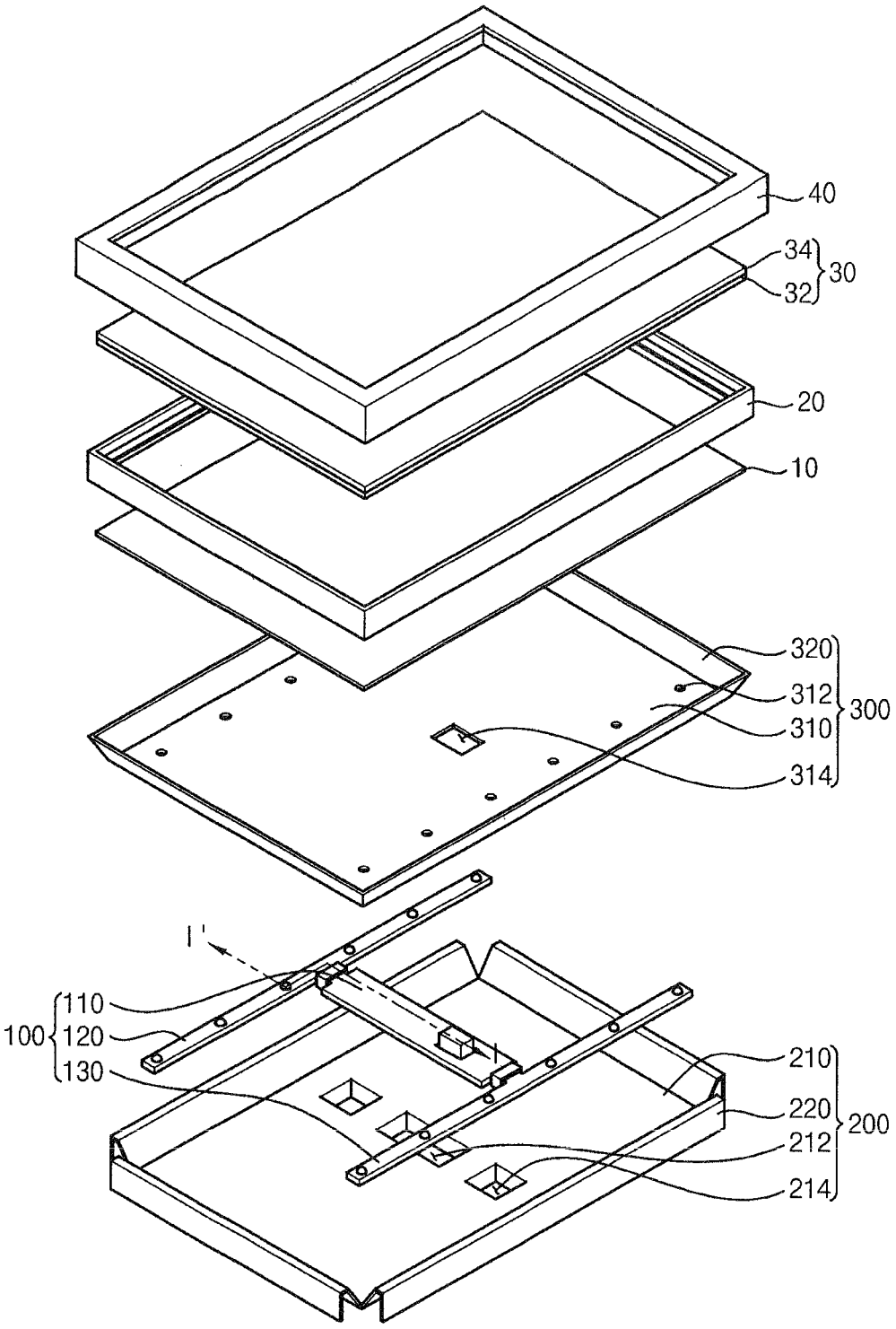


FIG. 1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34
32
30
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I'
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100
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212
214
200

FIG. 2

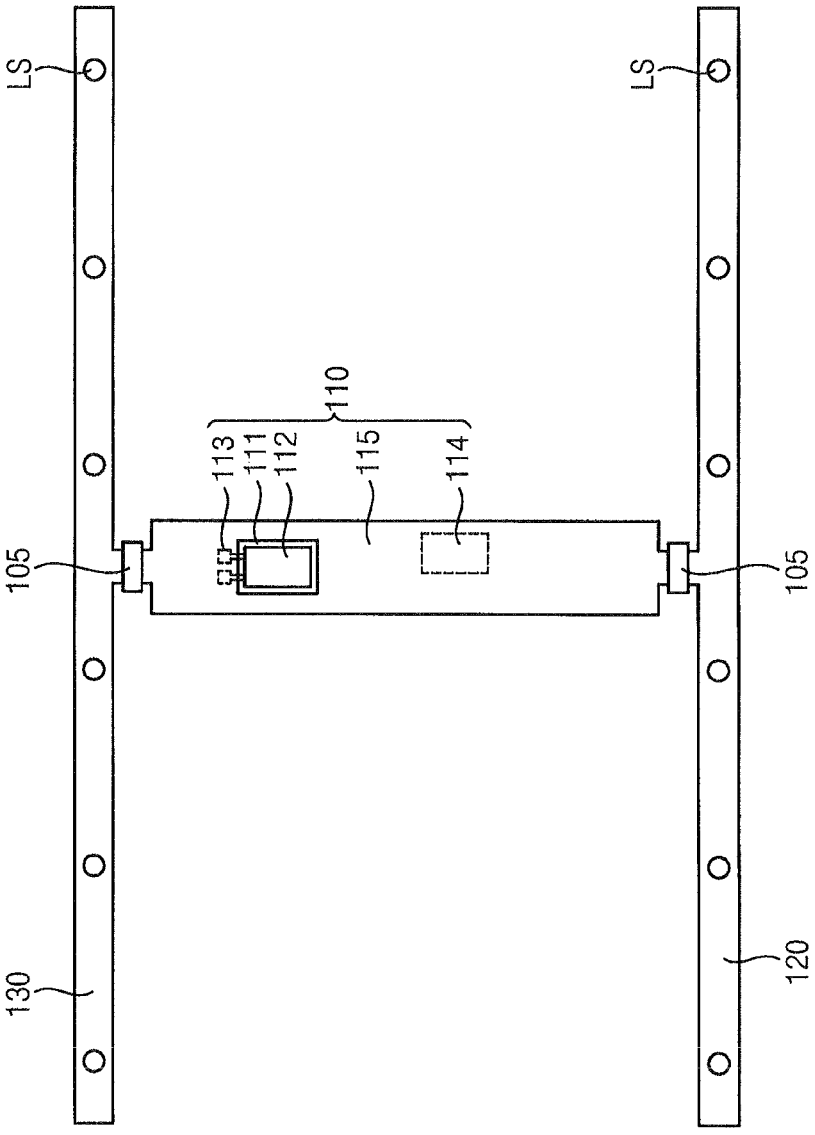
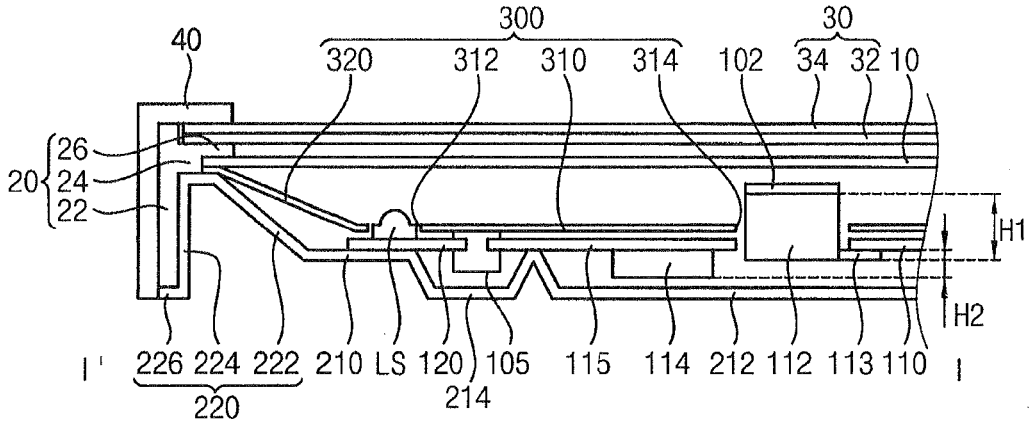


FIG. 3


300
30
40
320
312
310
314
102
34
32
10
26
20
24
22
H1
H2
I'
226
224
222
210
LS
120
105
115
114
212
112
113
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I
220
214

FIG. 4

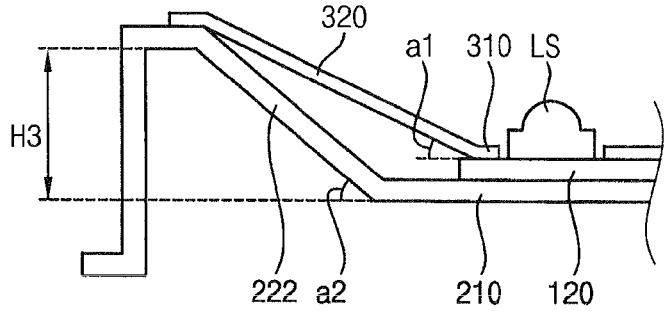

320
a1
310
LS
H3
222
a2
210
120

FIG. 5

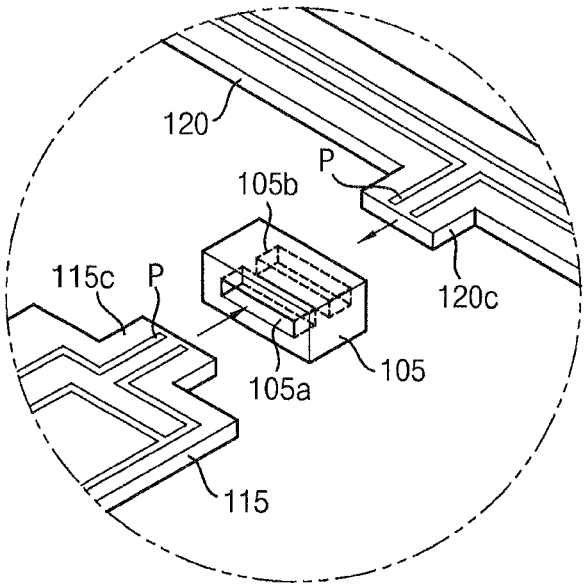


FIG. 6

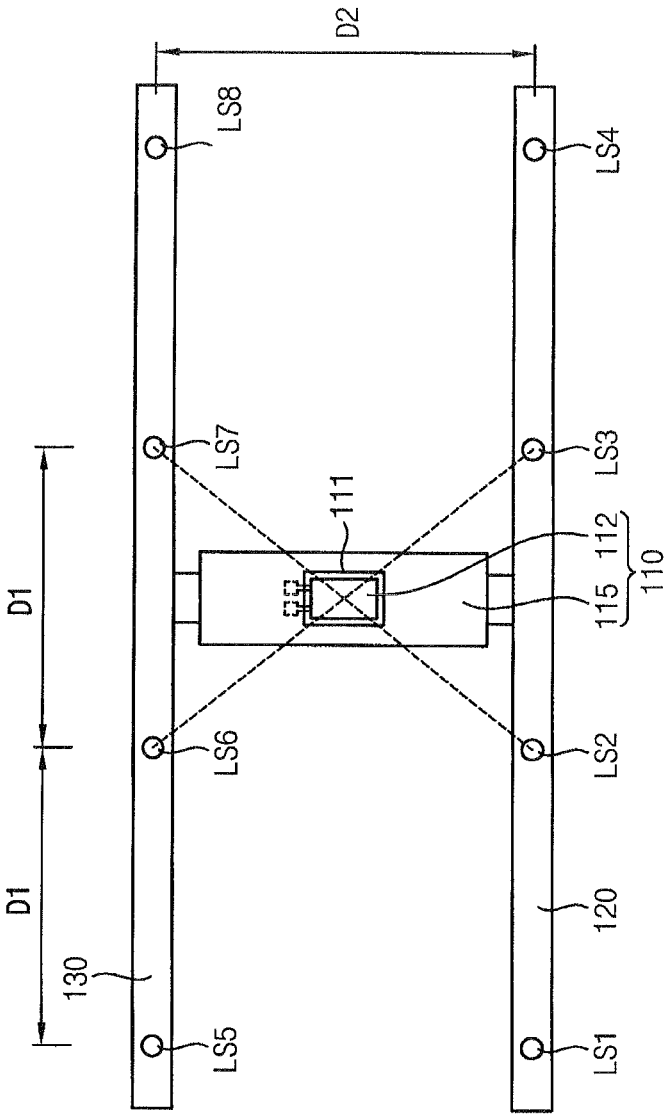
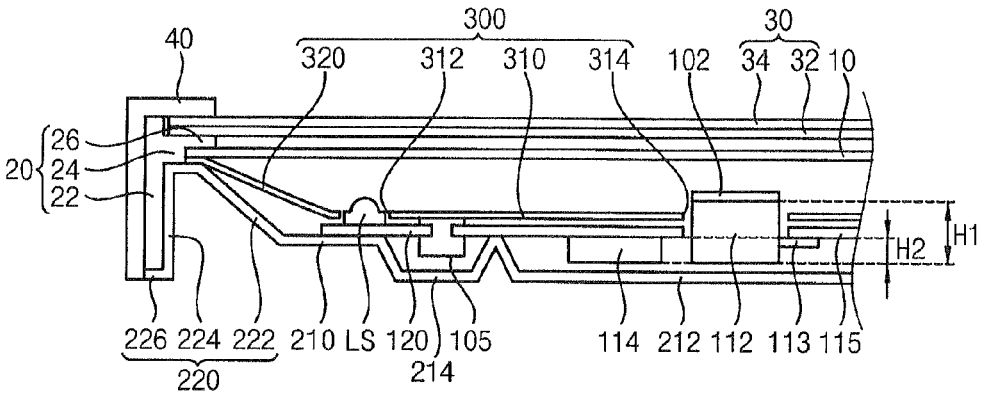


FIG. 7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114
212
112
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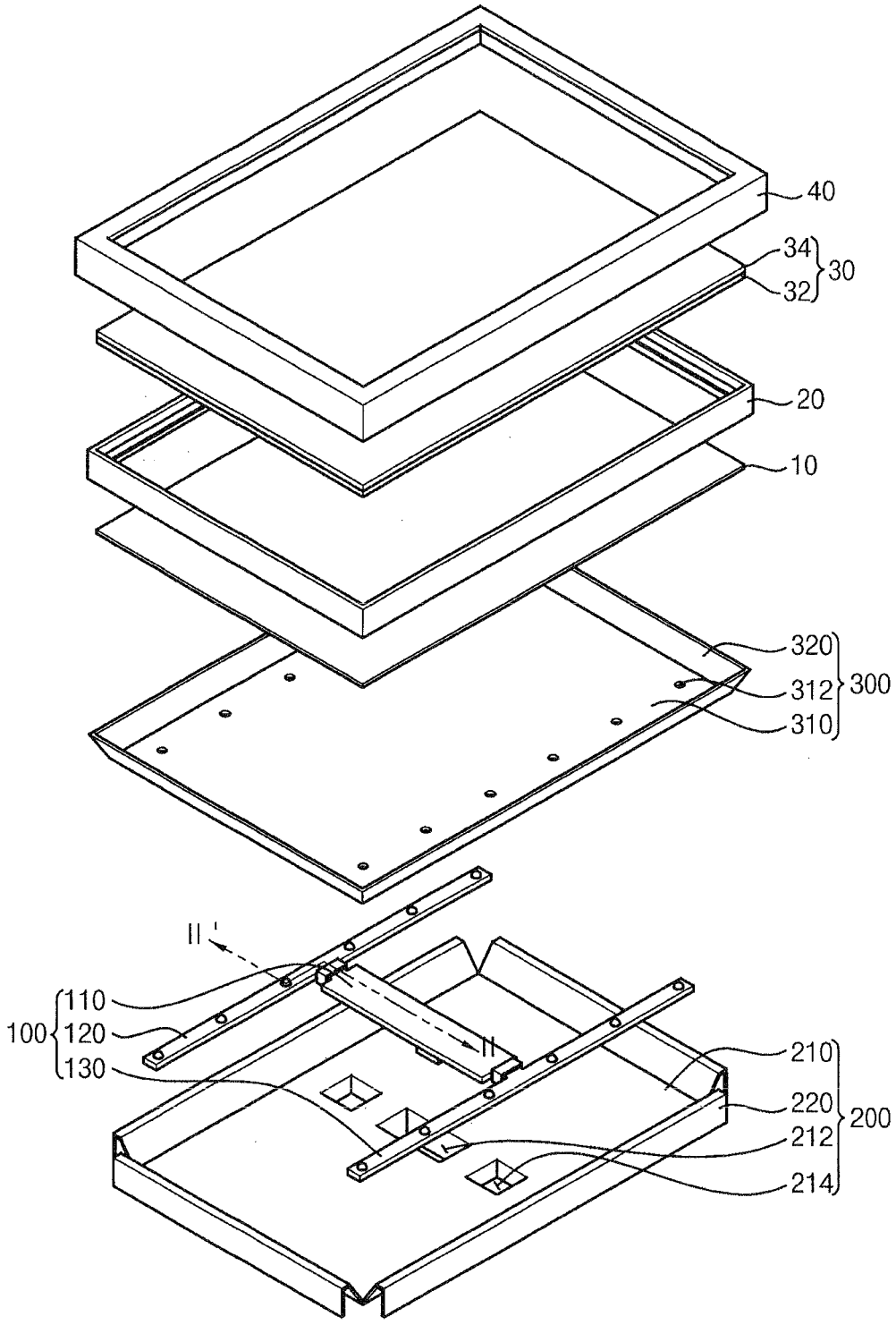
115

FIG. 8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34
32
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300
II'
II
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120
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100
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220
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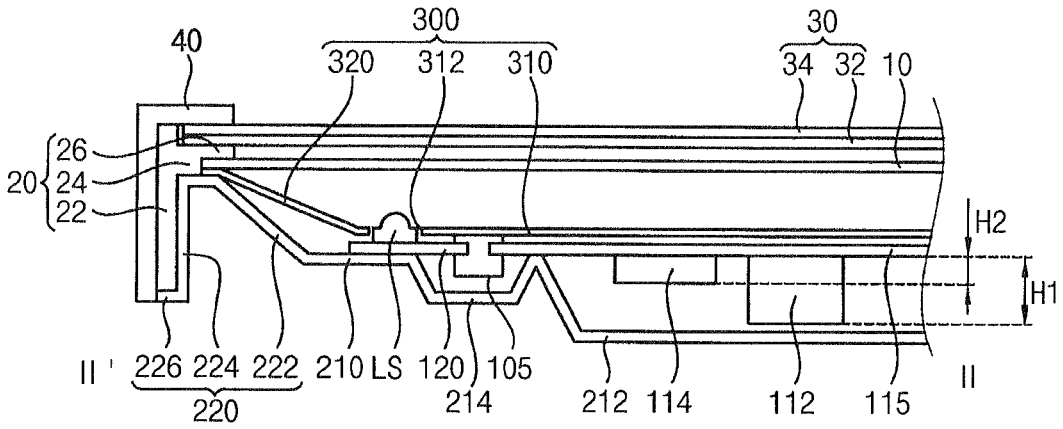
214
200

FIG. 9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120
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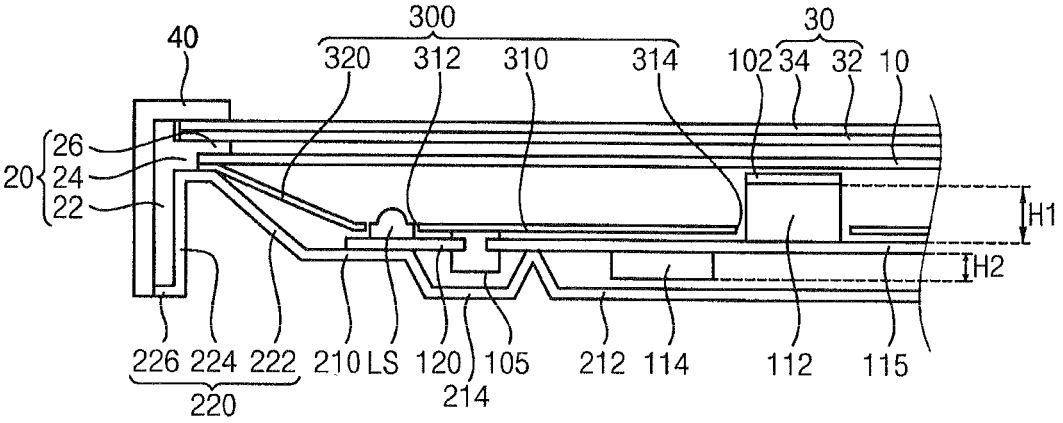
105
212
114
112
115
II

FIG. 10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LS
120
214
105
212
114
112
115

FIG. 11

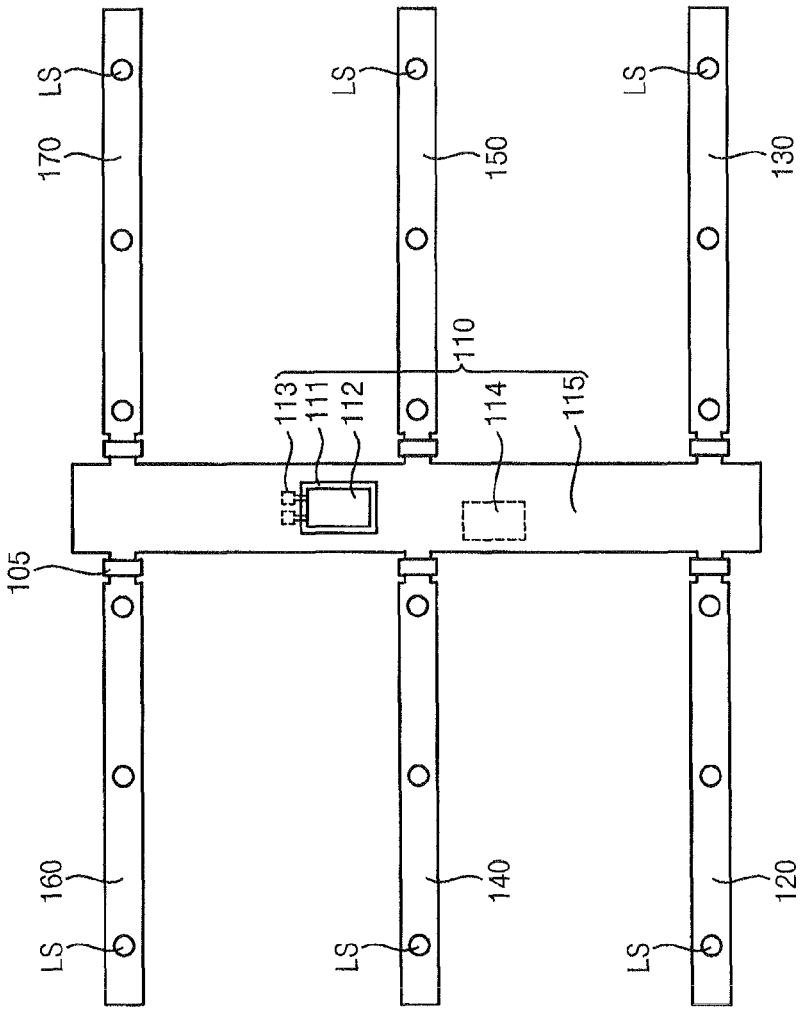
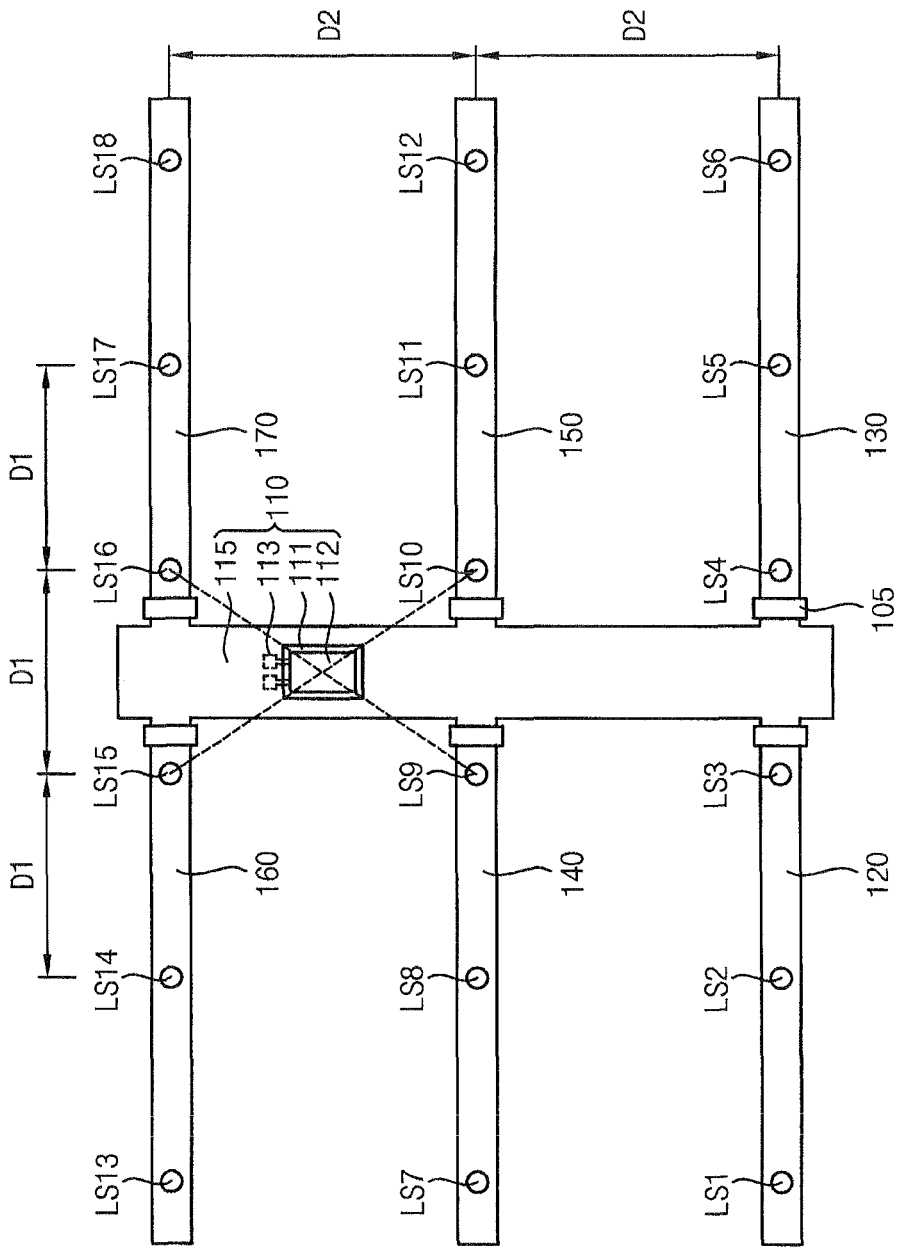


FIG. 12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D2
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LS7
LS6
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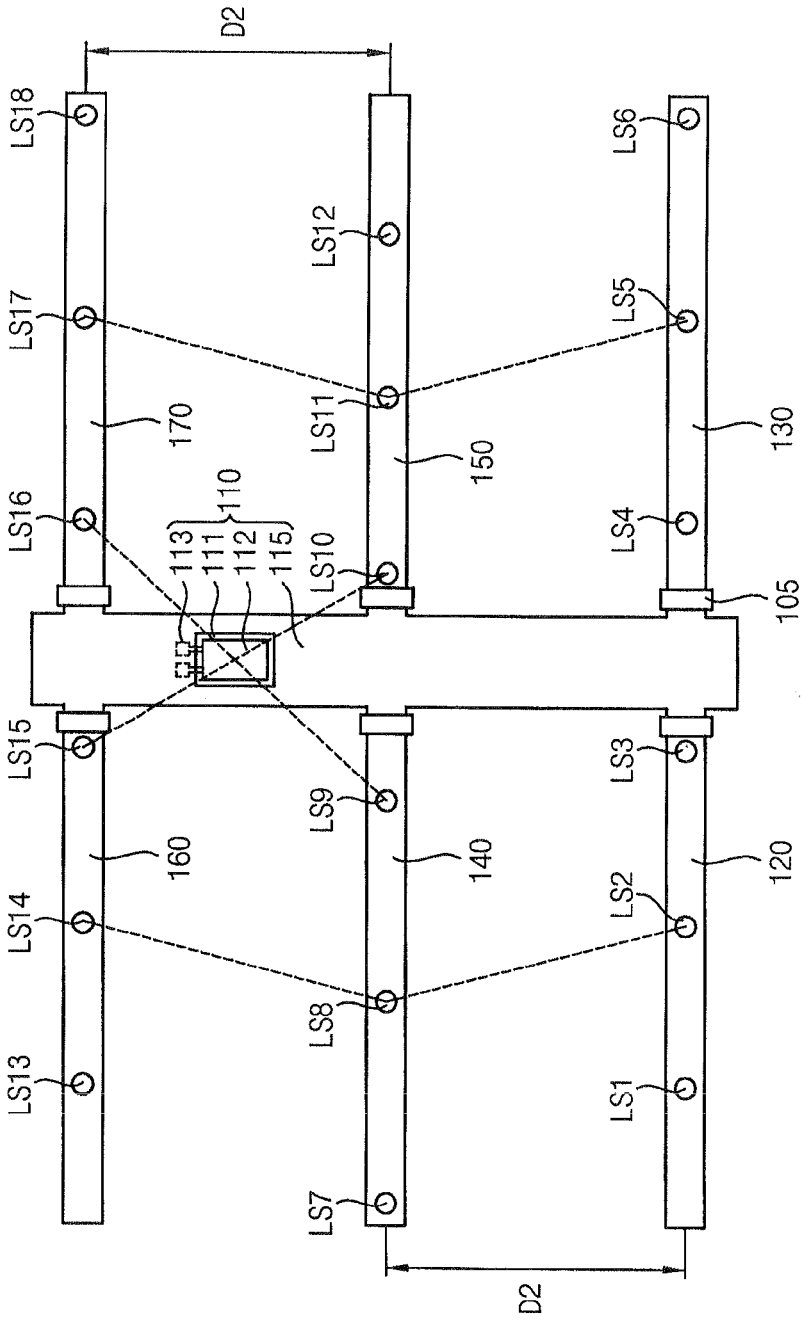
LS3
LS2
LS1
170
150
130
110
115
113
111
112
105
160
140
120

FIG. 13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112
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D2

BACKLIGHT ASSEMBLY AND A DISPLAY APPARATUS HAVING THE SAME

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority under 35 U.S.C. §119 to Korean Patent Application No. 10-2013-0085379, filed on Jul. 19, 2013, the disclosure of which is incorporated by reference herein in its entirety.

TECHNICAL FIELD

The present invention relates to a backlight assembly and a display apparatus including the backlight assembly.

More particularly, the present invention relates to a backlight assembly for a liquid crystal display apparatus and a display apparatus including the backlight assembly.

DISCUSSION OF THE RELATED ART

A liquid crystal display apparatus is used in a wide range of applications due to its small size, light weight and low-power-consumption, for example.

The liquid crystal display apparatus includes two display panels provided with a liquid crystal layer disposed therebetween and applies a voltage to a molecular arrangement of liquid crystal molecules in the liquid crystal layer to change the molecular arrangement. The liquid crystal display apparatus displays an image by using changes of an optical property (for example, birefringence, rotary polarization, dichroism and light scattering) of a liquid crystal cell according to the changes of the molecular arrangement.

The liquid crystal display apparatus includes a backlight assembly for providing light to a display panel for displaying an image. The backlight assembly includes a plurality of components, which contribute to the thickness of the liquid crystal display apparatus.

SUMMARY

An exemplary embodiment of the present invention provides a backlight assembly capable of improving assembly efficiency and decreasing whole thickness of a display apparatus.

An exemplary embodiment of the present invention provides a display apparatus including the backlight assembly.

According to an exemplary embodiment of the present invention, a backlight assembly includes a first light source part comprising a plurality of light sources and extending in a first direction, a second light source part comprising a plurality of light sources, wherein the second light source part is spaced apart from and in parallel with the first light source part, and a driving part disposed between the first light source part and the second light source part. The driving part is connected to the first and second light source parts, and is configured to drive the light sources of the first and second light source parts.

In an exemplary embodiment of the present invention, the driving part may include a driving part substrate, a transformer configured to boost an input voltage to a driving voltage for the light sources of the first and second light source parts, and a driving chip configured to process a driving signal for the light sources of the first and second light source parts.

In an exemplary embodiment of the present invention, an opening may be formed through the driving part substrate. The transformer may be disposed in the opening.

In an exemplary embodiment of the present invention, the driving chip of the driving part may be disposed on a surface of the driving part substrate. The transformer may be protruded from the surface of the driving part substrate by substantially the same height as the driving chip.

In an exemplary embodiment of the present invention, the transformer may be disposed at a center of the driving part substrate.

In an exemplary embodiment of the present invention, a reflecting layer may be formed on the transformer.

In an exemplary embodiment of the present invention, a center of the first light source part may be connected to a first side of the driving part. A center of the second light source part may be connected to a second side of the driving part which is opposite to the first side.

In an exemplary embodiment of the present invention, first and second connectors may be protruded from the center of the first light source part and the center of the second light source part, respectively. Third and fourth connectors may be protruded from the first side and the second side of the driving part, respectively. The first light source part and the second light source part may be connected to the driving part by first and second connecting parts, respectively. The first connecting part may include a first socket in which the first connecter of the first light source part is inserted, and a second socket in which the third connecter of the driving part is inserted.

According to an exemplary embodiment of the present invention, a display apparatus includes a backlight assembly, a reflecting element disposed on the backlight assembly, a display panel disposed on the reflecting element, and a receiving container configured to receive the backlight assembly, the reflecting element and the display panel. The backlight assembly includes a first light source part comprising a plurality of light sources and extending in a first direction, a second light source part comprising a plurality of light sources, wherein the second light source part is spaced apart from and in parallel with the first light source part, and a driving part disposed between the first light source part and the second light source part. The driving part is connected to the first and second light source parts, and is configured to drive the light sources of the first and second light source parts.

In an exemplary embodiment of the present invention, the reflecting element may include a bottom portion and an inclined portion formed at boundaries of the bottom portion. The inclined portion may be slanted with respect to the bottom portion. A plurality of light holes which corresponds to each of the light sources of the first and second light source parts may be formed through the bottom portion.

In an exemplary embodiment of the present invention, the driving part of the backlight assembly may include a driving part substrate, a transformer configured to boost an input voltage to a driving voltage for the light sources of the first and second light source parts, and a driving chip configured to process a driving signal for the light sources of the first and second light source parts.

In an exemplary embodiment of the present invention, a first opening may be formed through the driving part substrate. The transformer may be disposed in the first opening.

In an exemplary embodiment of the present invention, a second opening which exposes the transformer may be formed through the bottom portion of the reflecting element.

In an exemplary embodiment of the present invention, the driving chip of the driving part may be disposed on a surface of the driving part substrate. The receiving container may include a bottom chassis and a top chassis combined with the bottom chassis. The bottom chassis may include a bottom

plate in parallel with the display panel and a side wall extending from a boundary of the bottom plate and forming a receiving space. A first recess configured to receive the driving chip may be formed on the bottom plate.

In an exemplary embodiment of the present invention, the display apparatus may further include a connecting part configured to connect the first or second light source part to the driving part. A second recess configured to partially receive the connecting part may be formed on the bottom plate of the bottom chassis.

In an exemplary embodiment of the present invention, the driving part of the backlight assembly may be disposed between the bottom portion of the reflecting element and the bottom plate of the bottom chassis.

In an exemplary embodiment of the present invention, the side wall of the bottom chassis may extend from the bottom plate. The side wall may include an inclined surface inclined with respect to the bottom plate and an outer wall extending from the inclined surface perpendicular to the bottom plate.

In an exemplary embodiment of the present invention, the inclined portion of the reflecting element may make an angle about 20 degrees to about 30 degrees with respect to bottom portion.

According to an exemplary embodiment of the present invention, a display apparatus includes a backlight assembly, a reflecting element disposed on the backlight assembly, a display panel disposed on the reflecting element, and a receiving container configured to receive the backlight assembly, the reflecting element and the display panel. The backlight assembly includes a driving part disposed at a center of the display panel, a first light source part, a second light source part, a third light source part, a fourth light source part, a fifth light source part and a sixth light source part. The first light source part includes a plurality of light sources, extends in a first direction, and is connected to the driving part. The second light source part includes a plurality of light sources, extends in the first direction, is connected to the driving part, and disposed in a symmetrical relationship with the first light source part with respect to the driving part. The third light source part includes a plurality of light sources, extends in the first direction, is connected to the driving part, and is spaced apart from and disposed in parallel with the first light source part. The fourth light source part includes a plurality of light sources, extends in the first direction, is connected to the driving part, and is disposed in a symmetrical relationship with the third light source part with respect to the driving part. The fifth light source part includes a plurality of light sources, extends in the first direction, is connected to the driving part, and is spaced apart from and disposed in parallel with the third light source part. The sixth light source part includes a plurality of light sources, extends in the first direction, is connected to the driving part, and is disposed in a symmetrical relationship with the fifth light source part with respect to the driving part.

In an exemplary embodiment of the present invention, one of the light sources of the first light source part and one of the light sources of the fifth light source part may be arranged in a first column. Another one of the light sources of the first light source part and another one of the light sources of the fifth light source part may be arranged in a second column. One of the light sources of the third light source part may be disposed between the first and second columns.

According to an exemplary embodiment of the present invention, a backlight assembly, includes: a first light source part including a plurality of light sources arranged in a first direction; a second light source part including a plurality of light sources arranged in the first direction; and a driving part disposed between a central portion of the first and second light source parts, wherein the driving part includes an opening in which a transformer is disposed.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other features of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the accompanying drawings, in which:

FIG. **1** is an exploded perspective view illustrating a display apparatus according to an exemplary embodiment of the present invention;

FIG. **2** is a plan view illustrating a backlight assembly of FIG. **1**, according to an exemplary embodiment of the present invention;

FIG. **3** is a cross-sectional view taken along a line I-I' of FIG. **1**;

FIG. **4** is a partially-enlarged cross-sectional view illustrating an inclined portion of a reflecting element and an inclined surface of a side wall of a bottom chassis, according to an exemplary embodiment of the present invention;

FIG. **5** is an exploded perspective view illustrating a connecting part of the backlight assembly of FIG. **2**, according to an exemplary embodiment of the present invention;

FIG. **6** is a plan view illustrating a backlight assembly according to an exemplary embodiment of the present invention;

FIG. **7** is a cross-sectional view illustrating a display apparatus according to an exemplary embodiment of the present invention;

FIG. **8** is an exploded perspective view illustrating a display apparatus according to an exemplary embodiment of the present invention;

FIG. **9** is a cross-sectional view taken along a line II-II' of FIG. **8**;

FIG. **10** is a cross-sectional view illustrating a display apparatus according to an exemplary embodiment of the present invention;

FIG. **11** is a plan view illustrating a backlight assembly according to an exemplary embodiment of the present invention;

FIG. **12** is a plan view illustrating a backlight assembly according to an exemplary embodiment of the present invention; and

FIG. **13** is a plan view illustrating a backlight assembly according to an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Hereinafter, exemplary embodiments of the present invention will be explained in detail with reference to the accompanying drawings.

FIG. **1** is an exploded perspective view illustrating a display apparatus according to an exemplary embodiment of the present invention.

Referring to FIG. **1**, a display apparatus includes a backlight assembly **100**, a receiving container having a bottom chassis **200** and a top chassis **40**, a reflecting element **300**, an optical element **10**, a mold frame **20** and a display panel **30**.

The backlight assembly **100** provides light to the display panel **30**. The backlight assembly **100** includes a driving part **110**, a first light source part **120** and a second light source part **130**.

Each of the first light source part **120** and the second light source part **130** includes a plurality of light sources for generating the light. For example, the light source may be a spot light source such as a light emitting diode (LED).

The driving part **110** is electrically connected to the first light source part **120** and the second light source part **130**. The driving part **110** includes a driving circuit to drive the first light source part **120** and the second light source part **130**. For example, the driving part **110** may include a transformer (refer to **112** of FIG. **2**) for boosting an input voltage to a driving voltage for the first and second light source parts **120** and **130**, and a driving chip (refer to **114** of FIG. **2**) for processing a driving signal for the first and second light source parts **120** and **130**.

The reflecting element **300** is disposed on the backlight assembly **100**. The reflecting element **300** reflects the light from the backlight assembly **100** toward the display panel **30**. The reflecting element **300** includes a bottom portion **310** and an inclined portion **320** formed at boundaries of the bottom portion **310**. The inclined portion **320** is slanted with respect to the bottom portion **310** by a predetermined angle, so that the light from the backlight assembly **100** may be efficiently reflected toward the display panel **30**.

A plurality of light source holes **312** which corresponds to each of the light sources of the backlight assembly **100** is formed through the bottom portion **310**. When the reflecting element **300** is disposed on the backlight assembly **100**, the light sources of the backlight assembly **100** are exposed through the light source holes **312**.

In addition, an opening **314** which exposes a circuit component of the driving part **110** may be formed through the bottom portion **310**. For example, when the reflecting element **300** is disposed on the backlight assembly **100**, the transformer (refer to **112** of FIG. **2**) of the driving part **110** may be exposed through the opening **314**.

The optical element **10** is disposed on the reflecting element **300**. The optical element **10** may improve an optical property of the light from the backlight assembly **100**. Thus, the optical element **10** may make the light uniformly bright. The optical element **10** may include plurality of optical sheets. For example, the optical element **10** may include a protecting sheet, a prism sheet and a diffusion sheet. The diffusion sheet is disposed on a light exiting surface of a light guiding plate. The prism sheet is disposed on the diffusion sheet. The protecting sheet is disposed on the prism sheet. The prism sheet may include an upper prism sheet and a lower prism sheet. An axis of the upper prism sheet may be substantially perpendicular to an axis of the lower prism sheet. Although the optical element **10** is described as including the protecting sheet, the prism sheet and the diffusion sheet, many modifications to the optical element **10** are possible.

The display panel **30** is disposed on the optical element **10**. The display panel **30** displays an image using the light from the backlight assembly **100** according to a driving signal and a data signal. The display panel **30** includes an array substrate **32**, an opposite substrate **34** and a liquid crystal layer (not shown) between the array substrate **32** and the opposite substrate **34**.

The array substrate **32** includes a plurality of gate lines, a plurality of data lines crossing the gate lines, and a plurality of switching elements connected to the gate and data lines. The opposite substrate **34** may include a black matrix for blocking light and a color filter having a color. Although the opposite substrate **34** includes the color filter in the present exemplary embodiment, the color filter may be formed in the array substrate **32**. The liquid crystal layer is disposed between the array substrate **32** and the opposite substrate **34**. The liquid crystal layer includes liquid crystal molecules being optically anisotropic. The liquid crystal molecules are driven by an electric field, so that light may pass through or be blocked by the liquid crystal layer to display an image.

The display panel **30** may be electrically connected to a driving part (not shown) to drive the display panel **30**. For example, the driving part may be a flexible printed circuit board, the array substrate **32** may be electrically connected to the driving part, and the driving part is disposed on a bottom or side of the backlight assembly **100**.

The mold frame **20** supports and fixes components of the display apparatus. For example, the mold frame **20** supports the display panel **30** to fix the display panel **30** in the display apparatus.

The receiving container receives the components of the display apparatus. For example, the receiving container includes the bottom chassis **200** and the top chassis **40**. The bottom chassis **200** includes a bottom plate **210** and a side wall **220** extending from a boundary of the bottom plate **210**. The bottom plate **210** and the side wall **220** form a receiving space. A first recess **212** and a second recess **214** are formed on the bottom plate **210**. The first and second recesses **212** and **214** partially receive the backlight assembly **100**. The backlight assembly **100**, the reflecting element **300**, the optical element **10** the mold frame **20** and the display panel **30** are received in the receiving space. The top chassis **40** is combined with the bottom chassis **200**.

FIG. **2** is a plan view illustrating a backlight assembly of FIG. **1**, according to an exemplary embodiment of the present invention.

Referring to FIG. **2**, a backlight assembly includes a driving part **110**, a first light source part **120**, a second light source part **130** and a connecting part **105**.

The first light source part **120** has a bar shape extended in one direction. The first light source part **120** includes a plurality of light sources LS arranged in the direction. The light sources LS may be disposed at a predetermined distance from one another. The light source LS may be a spot light source. For example the light source LS may be an LED light source having a lens.

The second light source part **130** is spaced apart from the first light source part **120**, and in parallel with the first light source part **120**. The second light source part **130** has a bar shape extended in one direction. The second light source part **130** includes a plurality of light sources LS arranged in the direction. The light sources LS may be disposed at a predetermined distance from one another. The light source LS may be a spot light source. For example the light source LS may be an LED light source having a lens.

The driving part **110** is electrically connected to the first light source part **120** and the second light source part **130**, and configured to drive the first light source part **120** and the second light source part **130**. The driving part **110** is extended perpendicular to the direction in which the first light source part **120** and the second light source part **130** are extended. Thus, the first light source part **120** and the second light source part **130** may be connected by the driving part **110** at both ends of the driving part **110**.

The driving part **110** includes a driving part substrate **115**, a transformer **112** and a driving chip **114**. The transformer **112** boosts an input voltage to a driving voltage for the light source LS. For example, the transformer **112** may boost about 24V of the input voltage to about 300V of the driving voltage to drive the light source which is an LED light source. The driving chip **114** processes a driving signal for the light source

LS. For example, the driving chip **114** may be an integrated circuit (IC) chip for processing the driving signal for the light source LS.

The driving chip **114** may be disposed on a rear surface of the driving part substrate **115**. Thus, the driving chip **114** may face the bottom plate **210** of the bottom chassis **200**.

The transformer **112** may be disposed in an opening **111** formed through the driving part substrate **115**. The transformer **112** may be connected to a driving circuit of the driving part **110** by a connecting terminal **113**. The transformer **112** is disposed in the opening **111**, so that a total height of the driving part **110** may be decreased, since the transformer **112** is not disposed on the driving part substrate **115**.

The connecting part **105** connects the first light source part **120** to the driving part **110**, and connects the second light source part **130** to the driving part **110**. The connecting part **105** may have a connector for connecting the first or second light source part **120** or **130** to the driving part **110** for assembly efficiency. The connecting part **105** is connected to a central portion of the first light source part **120**, and connected to a central portion of the second light source part **130**, so that the driving part **110** may be disposed at center the first light source part **120** and the second light source part **130**. Thus, the backlight assembly **100** may be driven without an additional connecting circuit board for connecting the first light source part **120** and the second light source part **130**.

A detailed explanation about the connecting part **105** will be provided in reference to FIG. **5**.

FIG. **3** is a cross-sectional view taken along a line I-I' of FIG. **1**.

Referring to FIGS. **3** and **1**, a display apparatus includes a backlight assembly **100** having a driving part **110**, a first light source part **120** and a second light source part **130**, a bottom chassis **200**, a reflecting element **300**, an optical element **10**, a mold frame **20**, a display panel **30**, and top chassis **40**.

The bottom chassis **200** includes a bottom plate **210** and a side wall **220**.

A first recess **212** and a second recess **214** are formed on the bottom plate **210**. The first and second recesses **212** and **214** partially receive the backlight assembly **100**.

The side wall **220** includes an inclined surface **222**, an outside wall **224** and a supporting portion **226**. The inclined surface **222** extends from a boundary of the bottom plate **210**, and is inclined with respect to the bottom plate **210**. The outside wall **224** extends from the inclined surface **222** perpendicular to the bottom plate **210**. The supporting portion **226** extends from the outside wall **224** in parallel with the bottom plate **210** and is configured to support the mold frame **20**.

The driving part **110** includes a driving part substrate **115**, a transformer **112** and a driving chip **114**.

The driving part substrate **115** is disposed on the bottom plate **210** of the bottom chassis **200**. The driving chip **114** is disposed on a rear surface of the driving part substrate **115**. Thus, the driving chip **114** is disposed in the first recess **212** of the bottom plate **210**. A depth of the first recess **212** may be larger than a second height H2 of the driving chip **114**. Thus, the driving chip **114** may be spaced apart from a surface of the first recess **212**.

The transformer **112** may be disposed in an opening **111** formed through the driving part substrate **115**. The transformer **112** may have a first height H1. For example, the transformer **112** may boost about 24V of the input voltage to about 300V of the driving voltage to drive the light source which is an LED light source. In this case, the first height H1 of the transformer **112** may be about 15 mm. In addition, a length of a surface of the transformer **112** which is in parallel with the driving part substrate **115** may be about 30 mm.

The transformer **112** may be connected to a driving circuit of the driving part **110** by a connecting terminal **113**. A reflecting layer **102** may be formed on the transformer **112**. For example, the reflecting layer **102** may be formed by coating a reflective material on the transformer **112**.

The first light source part **120** having the light source LS may be disposed on the bottom plate **210** of the bottom chassis **200**, and in a plane the same as the driving part **110**. The first light source part **120** is electrically connected by the connecting part **105**. The connecting part **105** is partially disposed in the second recess **214** of the bottom plate **210** of the bottom chassis **200**.

The reflecting element **300** is disposed on the backlight assembly **100**. The reflecting element **300** includes a bottom portion **310** and an inclined portion **320** formed at boundaries of the bottom portion **310**. The inclined portion **320** is slanted with respect to the bottom portion **310** by a predetermined angle. The inclined portion **320** is disposed on the inclined surface **222** of the side wall **220** of the bottom chassis **200**. The inclined portion **320** is disposed adjacent to the light source LS, and extends to a boundary of the display apparatus. Thus, the number of the light sources LS of the backlight assembly **100** is decreased, and a size of the inclined portion **320** is increased, so that the angle between the inclined portion **320** and the bottom portion **310** is decreased. In addition, a total thickness of the display apparatus is decreased, so that the angle between the inclined portion **320** and the bottom portion **310** is decreased.

A plurality of light source holes **312** which corresponds to each of the light sources LS is formed through the bottom portion **310**. The light source LS is exposed through the light source hole **312**. In addition, an opening **314** corresponding to the transformer **112** of the driving part **110** is formed through the bottom portion **310**. The transformer **112** is exposed through the opening **314**.

The optical element **10** is disposed on the reflecting element **300**. The optical element **10** is spaced apart from the bottom portion **310** of the reflecting element **300**. The optical element **10** may improve an optical property of the light from the backlight assembly **100**.

The mold frame **20** is disposed between the outer wall **224** of the side wall **220** of the bottom chassis **200** and the top chassis **40**. The mold frame **20** includes a base frame **22**, an optical element receiving portion **24** and a panel supporting part **26**. The base frame **22** composes a body of the mold frame **20**. The optical element receiving portion **24** forms a space for receiving boundaries of the optical element **10** and boundaries of the inclined portion **320** of the reflecting element **300**. The panel supporting part **26** supports the display panel **30**.

The display panel **30** is disposed on the optical element **10**. The display panel **30** may be spaced apart from the optical element **10** by the panel supporting part **26** of the mold frame **20**. The display panel **30** displays an image using light from the backlight assembly **100** according to a driving signal and a data signal. The display panel **30** includes an array substrate **32**, an opposite substrate **34** and a liquid crystal layer (not shown) between the array substrate **32** and the opposite substrate **34**.

The top chassis **40** is combined with the mold frame **20** and the bottom chassis **200** to fix the display panel **30**.

FIG. **4** is a partially-enlarged cross-sectional view illustrating an inclined portion of a reflecting element and an inclined surface of a side wall of a bottom chassis, according to an exemplary embodiment of the present invention.

Referring to FIG. **4**, the bottom chassis includes a bottom plate **210** and a side wall including an inclined surface **222**. The reflecting element includes a bottom portion **310** and an inclined portion **320**.

The bottom portion **310** of the reflecting element makes a first angle a1 with the inclined portion **320**. The inclined portion **320** is adjacent to a light source LS of a first light source part **120**, and extends to a boundary of the display apparatus. The number of the light sources LS of the backlight assembly is decreased, the light source LS is disposed further from the boundary of the display apparatus and a size of the inclined portion **320** is increased, so that the first angle a1 is decreased. In addition, a total thickness of the display apparatus is decreased, a third height H3 of the side wall of the bottom chassis is decreased and the first angle a1 is decreased.

The inclined surface **222** of the bottom chassis makes a second angle a2 with the bottom plate **210**. The second angle a2 may be the same as or larger than the first angle a1. Although the inclined surface **222** of the bottom chassis is spaced apart from the inclined portion **320** of the reflecting element in the present exemplary embodiment, the inclined portion **320** may make contact with the inclined surface **222**.

The first angle a1 of the inclined portion **320** of the reflecting element may decrease, as the number of the light sources LS of the backlight assembly is decreased, or as the third height H3 of the side wall is decreased. For example, the first angle a1 may be about 20 degrees to about 30 degrees. Accordingly, the third height H3 may be less than about 20 mm.

FIG. **5** is an exploded perspective view illustrating a connecting part of the backlight assembly of FIG. **2**, according to an exemplary embodiment of the present invention.

Referring to FIG. **5**, a connecting part **105** includes a first socket **105***a* and a second socket **105***b* opposite to the first socket **105***a*.

A connector **115***c* of the driving part substrate **115** protruded from the driving part substrate **115** is inserted into the first socket **105***a* of the connecting part **105**. A circuit pattern P is formed on the connector **115***c* and electrically connected to the first socket **105***a*. A connector **120***c* of the first light source part **120** protruded from the first light source part **120** is inserted into the second socket **105***b* of the connecting part **105**. A circuit pattern P is formed on the connector **120***c* and electrically connected to the second socket **105***b*. The first and second sockets **105***a* and **105***b* are electrically connected each other, so that the driving part substrate **115** and the first light source part **120** may be electrically connected to the connecting part **105**.

FIG. **6** is a plan view illustrating a backlight assembly according to an exemplary embodiment of the present invention.

Referring to FIG. **6**, a backlight assembly includes a driving part **110**, a first light source part **120** and a second light source part **130**.

The first light source part **120** has a bar shape extended in one direction. The first light source part **120** includes first to fourth light sources LS1, LS2, LS3 and LS4 sequentially arranged in the direction. Each of the first to fourth light sources LS1, LS2, LS3 and LS4 is spaced apart from an adjacent light source by a first distance D1.

The second light source part **130** is spaced apart from the first light source part **120** by a second distance D2, and in parallel with the first light source part **120**. The second light source part **130** has a bar shape extended in one direction. The second light source part **130** includes fifth to eighth light sources LS5, LS6, LS7 and LS8 sequentially arranged in the direction. Each of the fifth to eighth light sources LS5, LS6, LS7 and LS8 is spaced apart from an adjacent light source by a first distance D1.

The first distance D1 may be substantially the same as the second distance D2. Thus, the first to eighth light sources LS1 to LS8 may be uniformly arranged.

The driving part **110** includes a driving part substrate **115** and a transformer **112**. The transformer **112** is disposed in an opening **111** formed through the driving part substrate **115**.

The transformer **112** may be the tallest and largest component among circuit components of a driving circuit of the driving part **110**. Thus, a portion of the transformer **112** may be protruded from an opening in a reflecting element (refer to **314** and **300** of FIG. **1**). The transformer **112** may be disposed at a position which is farthest from adjacent light sources (e.g., the second, third, sixth and seventh light sources LS2, LS3, LS6 and LS7) to minimize its influence on the adjacent light sources. For example, the transformer **112** may be disposed at an intersection point of a first straight line and a second straight line. The first straight line is from the second light source LS2 to the seventh light source LS7. The second straight line is from the third light source LS3 to the sixth light source LS6. Thus, the transformer **112** may be disposed at a center of the driving part **110**.

FIG. **7** is a cross-sectional view illustrating a display apparatus according to an exemplary embodiment of the present invention.

Referring to FIGS. **7** and **1**, a display apparatus includes a backlight assembly **100** having a driving part **110**, a first light source part **120** and a second light source part **130**, a bottom chassis **200**, a reflecting element **300**, an optical element **10**, a mold frame **20**, a display panel **30**, and top chassis **40**.

The bottom chassis **200** includes a bottom plate **210** and a side wall **220**.

A first recess **212** and a second recess **214** are formed on the bottom plate **210**. The first and second recesses **212** and **214** partially receive the backlight assembly **100**.

The side wall **220** includes an inclined surface **222**, an outside wall **224** and a supporting portion **226**. The inclined surface **222** extends from a boundary of the bottom plate **210**, and is inclined with respect to the bottom plate **210**. The outside wall **224** extends from the inclined surface **222** perpendicular to the bottom plate **210**. The supporting portion **226** extends from the outside wall **224** in parallel with the bottom plate **210** and is configured to support the mold frame **20**.

The driving part **110** includes a driving part substrate **115**, a transformer **112** and a driving chip **114**.

The driving part substrate **115** is disposed on the bottom plate **210** of the bottom chassis **200**. The driving chip **114** is disposed on a rear surface of the driving part substrate **115**. Thus, the driving chip **114** is disposed in the first recess **212** of the bottom plate **210**. A depth of the first recess **212** may be larger than a second height H2 of the driving chip **114**. Thus, the driving chip **114** may be spaced apart from a surface of the first recess **212**.

The transformer **112** may be disposed in an opening **111** formed through the driving part substrate **115**. The transformer **112** may have a first height H1. A portion of the transformer **112** is protruded from the rear surface of the driving part substrate **115** by a second height H2, the rest of the transformer **112** is protruded from the front surface of the driving part substrate **115**, except for the part of the transformer **112** disposed between the front and rear surfaces of the driving part substrate **115**. Thus, the transformer **112** is protruded from the rear surface of the driving part substrate **115** by the second height H2 the same as that of the driving

chip **114**, and protruded through an opening of the reflecting element **300**. Thus, the depth of the first recess **212** may be minimized, and the protruded height of the transformer **112** from the reflecting element **300** may be minimized at the same time.

The transformer **112** may be connected to a driving circuit of the driving part **110** by a connecting terminal **113**. A reflecting layer **102** may be formed on the transformer **112**. For example, the reflecting layer **102** may be formed by coating a reflective material on the transformer **112**.

The first light source part **120** having the light source LS may be disposed on the bottom plate **210** of the bottom chassis **200**, and in a plane the same as the driving part **110**. The first light source part **120** is electrically connected by the connecting part **105**. The connecting part **105** is partially disposed in the second recess **214** of the bottom plate **210** of the bottom chassis **200**.

The reflecting element **300** is disposed on the backlight assembly **100**. The reflecting element **300** includes a bottom portion **310** and an inclined portion **320** formed at boundaries of the bottom portion **310**. The inclined portion **320** is slanted with respect to the bottom portion **310** by a predetermined angle. The inclined portion **320** is disposed on the inclined surface **222** of the side wall **220** of the bottom chassis **200**. The inclined portion **320** is disposed adjacent to the light source LS, and extends to a boundary of the display apparatus.

A plurality of light source holes **312** which corresponds to each of the light sources LS is formed through the bottom portion **310**. The light source LS is exposed through the light source hole **312**. In addition, an opening **314** corresponding to the transformer **112** of the driving part **110** is formed through the bottom portion **310**. The transformer **112** is exposed through the opening **314**.

The optical element **10** is disposed on the reflecting element **300**. The optical element **10** is spaced apart from the bottom portion **310** of the reflecting element **300**. The optical element **10** may improve an optical property of the light from the backlight assembly **100**.

The mold frame **20** is disposed between the outside wall **224** of the side wall **220** of the bottom chassis **200** and the top chassis **40**. The mold frame **20** includes a base frame **22**, an optical element receiving portion **24** and a panel supporting part **26**. The base frame **22** composes a body of the mold frame **20**. The optical element receiving portion **24** forms a space for receiving boundaries of the optical element **10** and boundaries of the inclined portion **320** of the reflecting element **300**. The panel supporting part **26** supports the display panel **30**.

The display panel **30** is disposed on the optical element **10**. The display panel **30** may be spaced apart from the optical element **10** by the panel supporting part **26** of the mold frame **20**. The display panel **30** displays an image using light from the backlight assembly **100** according to a driving signal and a data signal. The display panel **30** includes an array substrate **32**, an opposite substrate **34** and a liquid crystal layer (not shown) between the array substrate **32** and the opposite substrate **34**.

The top chassis **40** is combined with the mold frame **20** and the bottom chassis **200** to fix the display panel **30**.

FIG. **8** is an exploded perspective view illustrating a display apparatus according to an exemplary embodiment of the present invention.

Referring to FIG. **8**, a backlight assembly illustrated therein is substantially the same as a backlight assembly of FIG. **1** except for a driving part **110**, a first recess **212** of a bottom plate **210** of a bottom chassis **200**, and a reflecting element **300**. Thus, any further descriptions concerning the same elements will be brief or omitted.

The display apparatus includes a backlight assembly **100**, a receiving container having a bottom chassis **200** and a top chassis **40**, a reflecting element **300**, an optical element **10**, a mold frame **20** and a display panel **30**.

The backlight assembly **100** provides light to the display panel **30**. The backlight assembly **100** includes a driving part **110**, a first light source part **120** and a second light source part **130**.

Each of the first light source part **120** and the second light source part **130** includes a plurality of light sources for generating the light.

The driving part **110** is electrically connected to the first light source part **120** and the second light source part **130**. The driving part **110** includes a driving circuit to drive the first light source part **120** and the second light source part **130**.

The reflecting element **300** is disposed on the backlight assembly **100**. The reflecting element **300** reflects the light from the backlight assembly **100** toward the display panel **30**. The reflecting element **300** includes a bottom portion **310** and an inclined portion **320** formed at boundaries of the bottom portion **310**.

A plurality of light source holes **312** which corresponds to each of the light sources of the backlight assembly **100** is formed through the bottom portion **310**. When the reflecting element **300** is disposed on the backlight assembly **100**, the light sources of the backlight assembly **100** are exposed through the light source holes **312**.

The optical element **10** is disposed on the reflecting element **300**. The optical element **10** may improve an optical property of the light from the backlight assembly **100**.

The display panel **30** is disposed on the optical element **10**. The display panel **30** displays an image using light from the backlight assembly **100** according to a driving signal and a data signal. The display panel **30** includes an array substrate **32**, an opposite substrate **34** and a liquid crystal layer (not shown) between the array substrate **32** and the opposite substrate **34**.

The mold frame **20** supports and fixes components of the display apparatus.

The receiving container receives the components of the display apparatus. For example, the receiving container includes the bottom chassis **200** and the top chassis **40**. The bottom chassis **200** includes a bottom plate **210** and a side wall **220** extending from a boundary of the bottom plate **210**. The bottom plate **210** and the side wall **220** form a receiving space. A first recess **212** and a second recess **214** for receiving a portion of the backlight assembly **100** may be formed on the bottom plate **210**. The top chassis **40** is combined with the bottom chassis **200**.

FIG. **9** is a cross-sectional view taken along a line II-II' of FIG. **8**.

Referring to FIGS. **9** and **8**, a display apparatus illustrated therein is substantially the same as a display apparatus of FIG. **3**, except for a transformer **112** of a driving part **110** of a backlight assembly **100**, a first recess **212** of a bottom plate **210** of a bottom chassis **200**, and a reflecting element **300**. Thus, any further descriptions concerning the same elements will be brief or omitted.

The display apparatus includes a backlight assembly **100** having a driving part **110**, a first light source part **120** and a second light source part **130**, a bottom chassis **200**, a reflecting element **300**, an optical element **10**, a mold frame **20**, a display panel **30**, and top chassis **40**.

The bottom chassis **200** includes a bottom plate **210** and a side wall **220**.

A first recess **212** and a second recess **214** are formed on the bottom plate **210**. The first and second recesses **212** and **214** partially receive the backlight assembly **100**.

The side wall **220** includes an inclined surface **222**, an outside wall **224** and a supporting portion **226**.

The driving part **110** includes a driving part substrate **115**, a transformer **112** and a driving chip **114**.

The driving part substrate **115** is disposed on the bottom plate **210** of the bottom chassis **200**. The driving chip **114** is disposed on a rear surface of the driving part substrate **115**. Thus, the driving chip **114** is disposed in the first recess **212** of the bottom plate **210**. A depth of the first recess **212** may be larger than a second height H2 of the driving chip **114**. Thus, the driving chip **114** may be spaced apart from a surface of the first recess **212**.

The transformer **112** may be disposed on the rear surface of the driving part substrate **115**. The transformer **112** may have a first height H1. The transformer **112** may be spaced apart from the surface of the first recess **212**. The first height H1 of the transformer **112** is larger than the second height H2 of the driving chip **114**, so that a depth of the first recess **212** is greater than the first height H1.

The first light source part **120** having the light source LS may be disposed on the bottom plate **210** of the bottom chassis **200**, and in a plane the same as the driving part **110**. The first light source part **120** is electrically connected by the connecting part **105**. The connecting part **105** is partially disposed in the second recess **214** of the bottom plate **210** of the bottom chassis **200**.

The reflecting element **300** is disposed on the backlight assembly **100**. The reflecting element **300** includes a bottom portion **310** and an inclined portion **320** formed at boundaries of the bottom portion **310**. The inclined portion **320** is slanted with respect to the bottom portion **310** by a predetermined angle. The inclined portion **320** is disposed on the inclined surface **222** of the side wall **220** of the bottom chassis **200**. The inclined portion **320** is disposed adjacent to the light source LS, and extends to a boundary of the display apparatus.

A plurality of light source holes **312** which corresponds to each of the light sources LS is formed through the bottom portion **310**. The light source LS is exposed through the light source hole **312**.

The optical element **10** is disposed on the reflecting element **300**. The optical element **10** is spaced apart from the bottom portion **310** of the reflecting element **300**. The optical element **10** may improve an optical property of the light from the backlight assembly **100**.

The mold frame **20** is disposed between the outer wall **224** of the side wall **220** of the bottom chassis **200** and the top chassis **40**. The mold frame **20** includes a base frame **22**, an optical element receiving portion **24** and a panel supporting part **26**.

The display panel **30** is disposed on the optical element **10**. The display panel **30** may be spaced apart from the optical element **10** by the panel supporting part **26** of the mold frame **20**. The display panel **30** displays an image using light from the backlight assembly **100** according to a driving signal and a data signal. The display panel **30** includes an array substrate **32**, an opposite substrate **34** and a liquid crystal layer (not shown) between the array substrate **32** and the opposite substrate **34**.

The top chassis **40** is combined with the mold frame **20** and the bottom chassis **200** to fix the display panel **30**.

FIG. **10** is a cross-sectional view illustrating a display apparatus according to an exemplary embodiment of the present invention.

Referring to FIGS. **10** and **8**, a display apparatus illustrated therein is substantially the same as a display apparatus of FIG. **3**, except for a transformer **112** of a driving part **110** of a backlight assembly **100**. Thus, any further descriptions concerning the same elements will be brief or omitted.

The display apparatus includes a backlight assembly **100** having a driving part **110**, a first light source part **120** and a second light source part **130**, a bottom chassis **200**, a reflecting element **300**, an optical element **10**, a mold frame **20**, a display panel **30**, and top chassis **40**.

The bottom chassis **200** includes a bottom plate **210** and a side wall **220**.

A first recess **212** and a second recess **214** are formed on the bottom plate **210**. The first and second recesses **212** and **214** partially receive the backlight assembly **100**.

The side wall **220** includes an inclined surface **222**, an outside wall **224** and a supporting portion **226**.

The driving part **110** includes a driving part substrate **115**, a transformer **112** and a driving chip **114**.

The driving part substrate **115** is disposed on the bottom plate **210** of the bottom chassis **200**. The driving chip **114** is disposed on a rear surface of the driving part substrate **115**. Thus, the driving chip **114** is disposed in the first recess **212** of the bottom plate **210**. A depth of the first recess **212** may be larger than a second height H2 of the driving chip **114**. Thus, the driving chip **114** may be spaced apart from a surface of the first recess **212**.

The transformer **112** is disposed on the driving part substrate **115**. The transformer **112** may have a first height H1.

A reflecting layer **102** may be formed on the transformer **112**. For example, the reflecting layer **102** may be formed by coating a reflective material on transformer **112**.

The first light source part **120** having the light source LS may be disposed on the bottom plate **210** of the bottom chassis **200**, and in a plane the same as the driving part **110**. The first light source part **120** is electrically connected by the connecting part **105**. The connecting part **105** is partially disposed in the second recess **214** of the bottom plate **210** of the bottom chassis **200**.

The reflecting element **300** is disposed on the backlight assembly **100**. The reflecting element **300** includes a bottom portion **310** and an inclined portion **320** formed at boundaries of the bottom portion **310**. The inclined portion **320** is slanted with respect to the bottom portion **310** by a predetermined angle. The inclined portion **320** is disposed on the inclined surface **222** of the side wall **220** of the bottom chassis **200**. The inclined portion **320** is disposed adjacent to the light source LS, and extends to a boundary of the display apparatus.

A plurality of light source holes **312** which corresponds to each of the light sources LS is formed through the bottom portion **310**. The light source LS is exposed through the light source hole **312**. In addition an opening **314** corresponding to the transformer **112** of the driving part **110** is formed through the bottom portion **310**. The transformer **112** is exposed through the opening **314**. The transformer **112** has the first height H1 and the reflecting layer **102** is spaced apart from the optical element **10**, so that a height of the side wall **220** is greater than the first height H1.

The optical element **10** is disposed on the reflecting element **300**. The optical element **10** is spaced apart from the bottom portion **310** of the reflecting element **300**. The optical element **10** may improve an optical property of the light from the backlight assembly **100**.

The mold frame **20** is disposed between the outer wall **224** of the side wall **220** of the bottom chassis **200** and the top

chassis **40**. The mold frame **20** includes a base frame **22**, an optical element receiving portion **24** and a panel supporting part **26**.

The display panel **30** is disposed on the optical element **10**. The display panel **30** may be spaced apart from the optical element **10** by the panel supporting part **26** of the mold frame **20**. The display panel **30** displays an image using light from the backlight assembly **100** according to a driving signal and a data signal. The display panel **30** includes an array substrate **32**, an opposite substrate **34** and a liquid crystal layer (not shown) between the array substrate **32** and the opposite substrate **34**.

The top chassis **40** is combined with the mold frame **20** and the bottom chassis **200** to fix the display panel **30**.

FIG. **11** is a plan view illustrating a backlight assembly according to an exemplary embodiment of the present invention.

Referring to FIG. **11**, a backlight assembly includes a driving part **110**, a first light source part **120**, a second light source part **130**, a third light source part **140**, a fourth light source part **150**, a fifth light source part **160**, a sixth light source part **170** and a connecting part **105**.

The first light source part **120** has a bar shape extended in a direction. The first light source part **120** includes a plurality of light sources LS arranged in the direction. The light sources LS may be disposed at a predetermined distance from each other. The light source LS may be a spot light source. For example the light source LS may be an LED light source having a lens.

The second light source part **130** is disposed in a symmetrical relationship with the first light source part **120** with respect to the driving part **110**. The second light source part **130** has a bar shape extended in the direction. The second light source part **130** includes a plurality of light sources LS arranged in the direction. The light sources LS may be disposed at a predetermined distance from each other. The light source LS may be a spot light source. For example the light source LS may be an LED light source having a lens.

The third light source part **140** is spaced apart from the first light source part **120**, and is disposed in parallel with the first light source part **120**. The third light source part **140** has a bar shape extended in the direction. The third light source part **140** includes a plurality of light sources LS arranged in the direction. The light sources LS may be disposed at a predetermined distance from each other. The light source LS may be a spot light source. For example the light source LS may be an LED light source having a lens.

The fourth light source part **150** is disposed in a symmetrical relationship with the third light source part **140** with respect to the driving part **110**. The fourth light source part **150** has a bar shape extended in the direction. The fourth light source part **150** includes a plurality of light sources LS arranged in the direction. The light sources LS may be disposed at a predetermined distance from each other. The light source LS may be a spot light source. For example the light source LS may be an LED light source having a lens.

The fifth light source part **160** is spaced apart from the third light source part **140**, and is disposed in parallel with the third light source part **140**. The fifth light source part **160** has a bar shape extended in the direction. The fifth light source part **160** includes a plurality of light sources LS arranged in the direction. The light sources LS may be disposed at a predetermined distance from each other. The light source LS may be a spot light source. For example the light source LS may be an LED light source having a lens.

The sixth light source part **170** is disposed in a symmetrical relationship with the fifth light source part **160** with respect to the driving part **110**. The sixth light source part **170** has a bar shape extended in the direction. The sixth light source part **170** includes a plurality of light sources LS arranged in the direction. The light sources LS may be disposed at a predetermined distance from each other. The light source LS may be a spot light source. For example the light source LS may be an LED light source having a lens.

The driving part **110** is electrically connected to the first to sixth light source parts **120** to **170**, and is configured to drive the first to sixth light source parts **120** to **170**. The driving part **110** is extended perpendicular to the direction in which the first to sixth light source parts **120** to **170** are extended. Thus, the first light source part **120** and the second light source part **130** may be connected to the driving part **110** at an end of the driving part **110**. The fifth light source part **160** and the sixth light source part **170** may be connected to the driving part **110** at another end of the driving part **110**. The third light source part **140** and the fourth light source part **150** may be connected to the driving part **110** at a center of the driving part **110**.

The driving part **110** includes a driving part substrate **115**, a transformer **112** and a driving chip **114**.

The driving chip **114** may be disposed on a rear surface of the driving part substrate **115**. Thus, the driving chip **114** may face a bottom plate of a bottom chassis.

The transformer **112** may be disposed in an opening **111** formed through the driving part substrate **115**. The transformer **112** may be connected to a driving circuit of the driving part **110** by a connecting terminal **113**.

FIG. **12** is a plan view illustrating a backlight assembly according to an exemplary embodiment of the present invention.

Referring to FIG. **12**, a backlight assembly includes a driving part **110**, and first to sixth light source parts **120** to **170**.

The first light source part **120** has a bar shape extended in a direction. The first light source part **120** includes a plurality of light sources LS arranged in the direction. The first light source part **120** includes first to third light sources LS1, LS2 and LS3 sequentially arranged in the direction.

The second light source part **130** is disposed in a symmetrical relationship with the first light source part **120** with respect to the driving part **110**. The second light source part **130** has a bar shape extended in the direction. The second light source part **130** includes fourth to sixth light sources LS4, LS5 and LS6. Each of the first to sixth light sources LS1 to LS6 is spaced apart from an adjacent light source by a first distance D1.

The third light source part **140** is spaced apart from the first light source part **120** by a second distance D2, and is disposed in parallel with the first light source part **120**. The third light source part **140** has a bar shape extended in the direction. The third light source part **140** includes seventh to ninth light sources LS7, LS8 and LS9.

The fourth light source part **150** is disposed in a symmetrical relationship with the third light source part **140** with respect to the driving part **110**. The fourth light source part **150** has a bar shape extended in the direction. The fourth light source part **150** includes tenth to twelfth light sources LS10, LS11 and LS12. Each of the seventh to twelfth light sources LS7 to LS12 is spaced apart from an adjacent light source by the first distance D1.

The fifth light source part **160** is spaced apart from the third light source part **140** by the second distance D2, and is disposed in parallel with the third light source part **140**. The fifth light source part **160** has a bar shape extended in the direction. The fifth light source part **160** includes thirteenth to fifteenth light sources LS13, LS14 and LS15.

The sixth light source part **170** is disposed in a symmetrical relationship with the fifth light source part **160** with respect to the driving part **110**. The sixth light source part **170** has a bar shape extended in the direction. The sixth light source part **170** includes sixteenth to eighteenth light sources LS16, LS17 and LS18. Each of the thirteenth to eighteenth light sources LS13 to LS18 is spaced apart from an adjacent light source by the first distance D1.

The first distance D1 may be substantially the same as the second distance D2. Thus, the first to eighteenth light sources LS1 to LS18 may be uniformly arranged.

The driving part **110** includes a driving part substrate **115** and a transformer **112**. The transformer **112** is disposed in an opening **111** formed through the driving part substrate **115**.

The transformer **112** may be the tallest and largest component among circuit components of a driving circuit of the driving part **110**. Thus, a portion of the transformer **112** may be protruded from a reflecting element (refer to **300** of FIG. **1**). The transformer **112** may be disposed at a position which is farthest from adjacent light sources (e.g., the ninth, tenth, fifteenth and sixteenth light sources LS9, LS10, LS15 and LS16) to minimize an influence to the adjacent light sources. For example, the transformer **112** may be disposed at an intersection point of a first straight line and a second straight line. The first straight line is from the ninth light source LS9 to the sixteenth light source LS16. The second straight line is from the tenth light source LS10 to the fifteenth light source LS15. For example, the transformer **112** may be disposed at an area ⅔ away from an end of the driving part **110** in a length direction of the driving part **110**.

FIG. **13** is a plan view illustrating a backlight assembly according to an exemplary embodiment of the present invention.

Referring to FIG. **13**, a backlight assembly illustrated therein is substantially the same as a backlight assembly of FIG. **12** except for positions of light sources. Thus, any further descriptions concerning the same elements will be brief or omitted.

The backlight assembly includes a driving part **110**, and first to sixth light source parts **130** to **170**.

The first light source part **120** includes first to third light sources LS1, LS2 and LS3. The second light source part **130** includes fourth to sixth light sources LS4, LS5 and LS6. The third light source part **140** includes seventh to ninth light sources LS7, LS8 and LS9. The fourth light source part **150** includes tenth to twelfth light sources LS10, LS11 and LS12. The fifth light source part **160** includes thirteenth to fifteenth light sources LS13, LS14 and LS15. The sixth light source part **170** includes sixteenth to eighteenth light sources LS16, LS17 and LS18.

The first to sixth light sources LS1 to LS6 of the first and second light source parts **120** and **130** are disposed corresponding to the thirteenth to eighteenth light sources LS13 to LS18 of the fifth and sixth light source parts **160** and **170**, respectively. Thus, the corresponding light sources are disposed in a same column. In addition, the seventh to twelfth light sources LS7 to LS12 of the third and fourth light source parts **140** and **150** are disposed between the columns formed by the light sources of the first, second, fifth and sixth light source part **120**, **130**, **160** and **170**. Thus, the light sources of the backlight assembly are disposed in a zigzag pattern in a column direction. Accordingly, the light sources may be uniformly arranged.

According to the exemplary embodiments of the present invention, a backlight assembly of a display apparatus includes a driving part disposed between a first light source part and a second light source part, so that the backlight assembly may be driven without an additional connecting circuit board for connecting the first light source part and the second light source part.

In addition, a transformer of the driving part is disposed in an opening of a driving part substrate, so that total thickness of the display apparatus may be decreased.

In addition, an angle between a bottom portion and an inclined portion of a reflecting element is decreased, so that total thickness of the display apparatus may be decreased and the number of light sources of the backlight assembly may be decreased.

In addition, the transformer of the driving part is disposed farthest from the light sources, so that light projected toward a display panel may be uniform.

While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the present invention as defined by the following claims.

What is claimed is:

1. A backlight assembly, comprising:

a first light source part comprising a plurality of light sources and extending in a first direction;

a second light source part comprising a plurality of light sources, wherein the second light source part is spaced apart from and in parallel with the first light source part; and

a driving part disposed between the first light source part and the second light source par, wherein the driving part is connected to the first and second light source parts, and is configured to drive the light sources of the first and second light source parts,

wherein the driving part comprises a driving part substrate, a transformer configured to boost an input voltage to a driving voltage for the light sources of the first and second light source parts, and a driving chip configured to process a driving signal for the light sources of the first and second light source parts.

2. The backlight assembly of claim **1**, wherein an opening is formed through the driving part substrate, and the transformer is disposed in the opening.

3. The backlight assembly of claim **2**, wherein the driving chip of the driving part is disposed on a surface of the driving part substrate, and the transformer is protruded from the surface of the driving part substrate by substantially the same height as the driving chip.

4. The backlight assembly of claim **1**, wherein the transformer is disposed at a center of the driving part substrate.

5. The backlight assembly of claim **1**, wherein a reflecting layer is formed on the transformer.

6. A backlight assembly, comprising:

a first light source part comprising a plurality of light sources and extending in a first direction;

a second light source part comprising a plurality of light sources, wherein the second light source part is spaced apart from and in parallel with the first light source part; and

a driving part disposed between the first light source part and the second light source part, wherein the driving part is connected to the first and second light source parts, and is configured to drive the light sources of the first and second light source parts,

wherein a center of the first light source part is connected to a first side of the driving part, and a center of the second light source part is connected to a second side of the driving part which is opposite to the first side,

wherein first and second connectors are protruded from the center of the first light source part and the center of the second light source part, respectively, and third and fourth connectors are protruded from the first side and the accord side of the driving part, respectively,

the first light source part and the second light source part are connected to the driving part by first and second connecting parts, respectively, and

the first connecting part comprises a first socket in which the first connector of the first light source part is inserted, and a second socket in which the third connector of the driving part is inserted.

7. A display apparatus, comprising:

a backlight assembly comprising:

a first light source part comprising a plurality of light sources and extending in a first direction;

a second light source part comprising a plurality of light sources, wherein the second light source part is spaced apart from and in parallel with the first light source part; and

a driving part disposed between the first light source part and the second light source part, wherein the driving part is connected to the first and second light source parts, and is configured to drive the light sources of the first and second light source parts;

a reflecting element disposed on the backlight assembly;

a display panel disposed on the reflecting element; and

a receiving container configured to receive the backlight assembly, the reflecting element and the display panel,

wherein the reflecting element comprises a bottom portion and an inclined portion formed at boundaries of the bottom portion,

the ink lined portion is slanted with respect to the bottom portion, and

a plurality of light holes which corresponds to each of the light sources of the first and second light source parts is formed through the bottom portion.

8. The display apparatus of claim **7**, wherein the driving part of the backlight assembly comprises a driving part substrate, a transformer configured to boost an input voltage to a driving voltage for the light sources of the first and second light source parts, and a driving chip configured to process a driving signal for the light sources of the first and second light source parts.

9. The display apparatus of claim **8**, wherein a first opening is formed through the driving part substrate, and the transformer is disposed in the first opening.

10. The display apparatus of claim **9**, wherein a second opening which exposes the transformer is formed through the bottom portion of the reflecting element.

11. The display apparatus of claim **8**, wherein the driving chip of the driving part is disposed on a surface of the driving part substrate,

the receiving container comprises a bottom chassis and a top chassis combined with the bottom chassis,

the bottom chassis comprises a bottom plate in parallel with the display panel and a side wall extending from a boundary of the bottom plate and forming a receiving space, and

a first recess configured to receive the driving chip is formed on the bottom plate.

12. The display apparatus of claim **11**, further comprising a connecting part configured to connect the first or second light source part to the driving part, and

wherein a second recess configured to partially receive the connecting part is formed on the bottom plate of the bottom chassis.

13. The display apparatus of claim **11**, wherein the driving part of the backlight assembly is disposed between the bottom portion of the reflecting element and the bottom plate of the bottom chassis.

14. The display apparatus of claim **11**, wherein the side wall of the bottom chassis extends from the bottom plate, and comprises an inclined surface inclined with respect to the bottom plate and an outer wall extending from the inclined surface perpendicular to the bottom plate.

15. The display apparatus of claim **7**, wherein the inclined portion of the reflecting element makes an angle about 20 degrees to about 30 degrees with respect to bottom portion.

16. A display apparatus, comprising;

a backlight assembly;

a reflecting element disposed on the backlight assembly;

a display panel disposed on the reflecting element; and

a receiving container configured to receive the backlight assembly, the reflecting element and the display panel, and

wherein the backlight assembly comprises:

a driving part disposed at a center of the display panel;

a first light source part comprising a plurality of light sources, wherein the first light source part extends in a first direction and is connected to the driving part;

a second light source part comprising a plurality of light sources, wherein the second light source part extends in the first direction, is connected to the driving part and is disposed in a symmetrical relationship with the first light source part with respect to the driving part;

a third light source part comprising a plurality of light sources, wherein the third light source part extends in the first direction, is connected to the driving part, and is spaced apart from and disposed in parallel with the first light source part;

a fourth light source part comprising a plurality of light sources, Wherein the fourth light source part extends in the first direction, is connected to the driving part and is disposed in a symmetrical relationship with the third light source part with respect to the driving part;

a fifth light source part comprising a plurality of light sources, wherein the fifth light source part extends in the first direction, is connected to the driving part, and is spaced apart from and disposed in parallel with the third light source part; and

a sixth light source part comprising a plurality of light sources, wherein the sixth light source part extends in the first direction, is connected to the driving part, and is disposed in a symmetrical relationship with the filth light source part with respect to the driving part.

17. The display apparatus of claim **16**, wherein one of the light sources of the first light source part and one of the light sources of the fifth light source part are arranged in a first column, and another one of the light sources of the first light source part and another one of the light sources of the fifth light source part are arranged in a second column, and

one of the light sources of the third light source part is disposed between the first and second columns.

18. A backlight assembly, comprising:

a first light source part including a plurality of light sources arranged in a first direction;

a second light source part including a plurality of light sources arranged in the first direction; and

a driving part disposed between a central portion of the first and second light source parts, wherein the driving part includes an opening in which a transformer is disposed.

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